

REMARKS

Claims 1, 3, 4, 9-11, 14-15 and 46-62 are presented for examination.

As an initial matter, Applicants note that the Examiner characterizes the present application as being “directed to a method of making a battery electrode wherein the disclosed inventive concept comprises forming a cathode layer and removing the substrate.” Office Action at page 3. Applicants wish to remind the Examiner that the claimed invention must be considered as a whole (MPEP 2141, Hodash v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5 (Fed. Cir. 1986)). The “inventive concept” identified by the Examiner does not include each limitation of the subject claims, and is therefore inapposite. Distilling an invention down to the “gist” or inventive concept disregards the requirement of analyzing the claimed subject matter as a whole. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540 (Fed. Cir. 1983). Accordingly, Applicants request the Examiner consider the claims as a whole in assessing their patentability.

Claims 47-49 are rejected under 35 U.S.C. § 112, second paragraph, as indefinite for depending from a cancelled claim. The dependency of claim 47 has been amended, obviating this rejection.

Claims 1, 3-4, 9-11 and 14-15 are rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 6,402,796 (Johnson) in view of U.S. Patent No. 5,834,052 (Fukumura). Claim 1, the only independent claim of this group, covers a method of making a battery electrode comprising forming a first layer comprising a cathode mixture on a substrate, removing the substrate from the first layer, and incorporating the first layer into the battery electrode, wherein the cathode mixture is in the form of a slurry.

The Examiner has not stated a *prima facie* case of obviousness. In both the instant and the previous office actions, the Examiner stated the following:

...it would have been obvious to one skilled in the art at the time the invention was made to use the cathode mixture slurry of Fukumura et al. in the method of Johnson as Fukumura et al. teach that such coating solution slurry also serves as a protective layer. Thus, the cathode material in the form of a slurry acts as a protective feature too.

See instant Office Action at page 6, Office Action of 5/20/05 at page 6. In other words, the Examiner has identified a motivation only to incorporate the *protective coating* of Fukumura into the disclosure of Johnson. But were the protective coating of Fukumura to be so combined, the combination fails to include each limitation of the claims. Fukumura expressly recites that “there are a layer containing an active material and a layer containing *no active material...*” *See* col. 4, lines 15-16 (emphasis added). Fukumura then discusses several ways in which the layer containing no active material is used. One such way is to use it as a “protective layer for physically or chemically protecting the layer containing an active material” by applying it to the outside of the layer containing active material. *See* col. 6, lines 6-10. Thus, the *protective layer* is a layer that contains *no active material*. Thus, even were one of skill in the art motivated to combine Fukumura with Johnson on the basis of the desire to form a protective layer on the electrode of Johnson, the protective coating that would be taken from Fukumura does not include a cathode active material and thus does not provide the cathode mixture that the Examiner acknowledges as being absent from Johnson.

Further, the combination of the protective coating of Fukumura with the disclosure of Johnson fails to disclose or suggest the forming of a cathode mixture on a substrate. Johnson does not disclose or suggest a cathode mixture, but rather a single lithium compound. *See, e.g.*, col. 2, lines 9-12 (“[e]ach battery cell 10 has a cathode made of *a* lithium intercalation compound, or lithium metal oxide...”) (emphasis added). The Examiner alleges that Johnson discloses cathodes made of “mixed metal oxides which are compounds formally derived from an individual metal oxides [sic] but contain two or more metal species often in arbitrary ratio.” *See* Office Action at page 4. Johnson, to the contrary, nowhere identifies the cathode material as being in arbitrary ratio. Instead, Johnson refers to lithium metal oxides having the structure LiM_xO_y . While the ratio of metal M and oxygen O to lithium will differ, depending on what metal M is employed, there is nothing to indicate that, for a given metal M, the ratio is arbitrary or variable. One of skill in the art would recognize this disclosure as meaning that a single, clearly-defined compound is employed. Johnson further does not disclose the means by which the lithium compounds are “formally derived,” and any speculation by the Examiner as to how these compounds are derived is mere conjecture. Fukumura’s protective coatings do not provide the cathode mixture that is absent from Johnson, because the protective coatings, as explained

above, lack a cathode active material. Accordingly, the combination suggested by the Examiner does not disclose or suggest the cathode mixture limitation, and a *prima facie* case of obviousness is not established.

To the extent that the Examiner is suggesting that some other portion of Fukumura can be combined with Johnson to arrive at the instant claims, the Examiner has yet to establish a *prima facie* case of obviousness in that no motivation for combining any other part of Fukumura with Johnson has been identified. Applicants point out that, no matter how relevant the references are to each other or to the subject claims, the motivation to modify the disclosure of one reference with that of another must be demonstrated.

Applicants further contend that, not only has no motivation to combine the references been shown, the references teach away from the proposed modification. Johnson states " it is imperative that the battery which powers [small electronics devices] be made as small as possible in order to provide the greatest volumetric power density. [A] need remains for a method of producing a thin film battery with a greater volume of active material and a *minimal volume of inactive material* in order to achieve a high volumetric power density. It is to the provision of such therefore that the present invention is primarily directed." (Col. 1, lines 23-26 and lines 35-40, emphasis added.) Fukumura notes that "the layer containing no active material [e.g., a protective layer] essentially reduces the capacity of a battery..." *See* col. 6, lines 16-17. Thus, the references teach away from the inclusion of the protective layer of Fukumura in the batteries of Johnson.

As separate and additional grounds for the patentability of the claims, Applicants maintain that the Examiner has not established a reasonable expectation of success of the combination. Johnson indicates that its cathodes are "made of" a lithium intercalation compound or lithium metal oxide. *See* col. 2, lines 9-11. Johnson requires that the cathode be sputtered from "an LiCoO₂ target or other suitable litigated metal oxide target." Johnson further identifies a solid as each of the components that are applied by sputter deposition (SiO₂ insulator, lithium phosphorous oxynitride solid state electrolyte, various metals and/or oxides as the anode, etc.; *see* col. 2, lines 5-28). Each of the materials identified as a sputtering target in Johnson is a solid. As noted in the previous response, there is nothing in either Johnson or Fukumura to suggest that such sputter deposition can successfully be employed using a slurry rather than a

solid target, and the Examiner has presented no alternative factual support for the proposition that sputtering a slurry is feasible. A reasonable expectation of success is a part of the initial showing that the Examiner must make to establish a *prima facie* case of obviousness, and until such a showing is made, the Applicants are not required to present evidence that a slurry cannot be sputter deposited. *See, e.g., In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997) (once a *prima facie* case has been made, the burden of production falls upon the applicant); *In re Rijckaert*, 9 F.3d 1531, 1532 (Fed. Cir. 1993) (the Examiner bears the initial burden of presenting a *prima facie* case of obviousness; only if that burden is met does the burden of coming forward with evidence or argumentation shift to the applicant). The Examiner has noted that the PTO lacks the proper equipment or instruments to carry out experimentation to determine if a slurry can be sputter deposited. *See* Office Action at page 16. This is inapposite. If the references do not suggest the feasibility of such, and the Examiner can find no suggestion that such is possible elsewhere in the prior art (as of the date of the invention), then it is not relevant whether the sputter deposition of a slurry would ultimately turn out to be feasible enough to present a reasonable expectation of success. The expectation of success must exist in the art such that one of skill in the art would recognize the invention as obvious.

Accordingly, Applicants request that the Examiner provide technical support that sputtering a slurry is feasible such that it would lead to a reasonable expectation of success. Otherwise, for this additional reason, a *prima facie* case of obviousness has not been established.

For at least the above reasons, the rejection of the claims over Johnson in view of Fukumura should be withdrawn.

Claims 1, 3-4, 9-11 and 14-15 are rejected under 35 U.S.C. § 103(a) as obvious over Fukumura in view of Johnson.

The Examiner, in making this rejection, requires one of skill in the art to apply a cathode to a cathode current collector (the "base material sheet of Fukumura, , *see* col. 3, lines 55-57); to then remove the current collector from the cathode material; and to then re-apply a current collector to the cathode material. The cited motivation is to allow the formation of batteries having a greater volume of active material and a minimal volume of inactive material. Such an argument is inapposite. The base material sheet of Fukumura is a necessary battery component, and is not an inactive sheet of substrate that is merely taking up volume. Clearly, one of skill in

the art would not be motivated to go to the added expense and difficulty in removing a current collector to then be required to apply a current collector, and in fact, would be motivated against such a modification of Fukumura.

Applicants wish to point out, in response to the Examiner's Response to Arguments (pages 14-17 of the office action), that the presence or absence of reference to a current collector in the subject claims is not relevant to this argument. Instead, the relevance of the current collector of Fukumura goes to the *motivation*, or absence thereof, to modify the Fukumura reference with the disclosure of the Johnson reference. Applicants argue that, given that both Fukumura and Johnson require current collectors, one of skill in the art would not be motivated to remove the current collector of Fukumura, and as such, the references are not combinable in this fashion for obviousness purposes.

As no motivation to modify the primary reference in the fashion suggested by the Examiner can be shown, and no reasonable expectation of success has been demonstrated, a *prima facie* case of obviousness has not been established, and the rejection should be withdrawn.

Claims 46 and 50-62 are rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent Johnson in view of Fukumura and/or Fukumura in view of Johnson, further in view of U.S. Application Publication No. 2002/0168576 ("Hamamoto"), and claims 52-61 have been rejected under 35 U.S.C. § 103(a) as obvious over Johnson in view of Hamamoto.

A *prima facie* case of obviousness has not been established because there has been no showing of motivation to combine Hamamoto with Johnson and/or Fukumura. Hamamoto is concerned with the problem of the decomposition of carbonaceous material in a lithium battery anode by cyclic carbonates contained in the electrolyte. *See ¶¶ 0005-0007*. Hamamoto uses an electrolyte having a vinylene carbonate having a chlorine content of less than 100 ppm to overcome this problem. It is the electrolyte to which Hamamoto attributes the superior characteristics of the battery. *See, e.g., ¶¶ 0026 and 0034*. Hamamoto expressly indicates that "[t]he components, other than the electrolyte, constituting the secondary battery are not particularly limited." *See ¶ 0041*. Thus, Hamamoto provides no motivation to modify any of the Johnson and/or Fukumura components *other than the electrolyte*. Absent some motivation to make the suggested modification, a *prima facie* case of obviousness is not established.

As a separate and additional ground for patentability of the claims, there is nothing in either Johnson or Hamamoto to suggest that the sputter deposition of Johnson can successfully be employed using the cathode paste of Hamamoto for a target rather than a solid target, and the Examiner has presented no alternative factual support for the proposition that sputtering a paste is feasible. Therefore, Applicants submit that there is no motivation to combine to references.

As no motivation to modify the primary reference in the fashion suggested by the Examiner can be shown, and no reasonable expectation of success has been demonstrated, a *prima facie* case of obviousness has not been established, and the rejection should be withdrawn.

Applicants believe the claims are in condition for allowance, which action is requested. Upon allowance of the pending claims, Applicants request consideration of claims 5-8, 12, 13, 16-21 to additional species, which are written in dependent form or otherwise can be amended to include all the limitations of claim 1.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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